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'Fitting it in': A study exploring ICT use in a UK primary school

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This paper presents a case study of a primary school which was seen as using ICT effectively to support teaching and learning. Research was carried out over two years (2003-2005) and included observation of lessons, document analysis, interviews, and questionnaires with staff at the school. It was found that 'fitting ICT in', rather than 'effective use of ICT', provided a more accurate description of the complex decisions and actions that were made regarding ICT use in the school. Using a grounded theory framework the paper describes the causal conditions; the contextual conditions; the intervening conditions and the consequences for staff and pupils associated with 'fitting ICT in'. The study argues for an approach to research which seeks to develop collaboration and understanding between researchers and practitioners.

Background

Despite widespread claims about its potential to benefit education (see, for example, Cox et al, 2003, Harrison et al, 2002, Somekh at al, 2006), information and communications technology (ICT) has made comparatively little impact on teaching and learning in schools (e.g. Jamieson-Proctor, Burnett, Finger & Watson, 2006; Reynolds, Treharne & Tripp, 2003). This has led to much interest into what is influencing teachers and schools in their use of ICT.

A wide range of UK and international literature has noted the role of *school factors* such as location of computers (Abbot, 2001; Harrison et al, 2002; Watson, 1990); resources and technical support (Becta, 2001; Harrison et al, 2002; Hoffman, 1996; Moseley et al,1999); the role of senior staff and that of the ICT coordinator (Becta, 2001; Harrison et al, 2002; Hoffman, 1996; Lawson & Comber, 1999; Lim, Khine, Hew, Wong, Shanti & Lim, 2003); the school ethos and ICT policies (Becta, 2001; Lawson & Comber, 1999; Tearle, 2002); planning and training (Becta, 2001; Cox et al, 1999; Lawson & Comber, 1999) including lack of pedagogical leadership (Baskin & Williams, 2006). Research has also considered *teachers as individuals*, their levels of confidence in using IT (Becta, 2001; Broadfield, 2001; Cox et al, 1999; Harrison et al, 2002; Lawson & Comber, 1999; Moseley et al, 1999); their general teaching approach (Becker, 2000; Veen, 1993) and lack of belief that ICT can make a difference (Jamieson-Proctor, Burnett, Finger & Watson, 2006). *Pupil factors* have, in addition, been discussed in some studies, particularly pupil ICT skills (Becta, 2001; Moseley et al, 1999).

Finally, some of the literature has taken a *wider view* on the use of ICT such as conflicting pressures upon the school timetable (Harrison et al, 2002; Lawson & Comber, 1999); the nature of curriculum subjects (Cuban 1993; Goodson & Mangan, 1995; Harrison et al, 2002; Leach & Moon, 2000); curriculum objectives (Kennewell et al, 2000; Moseley et al, 1999); LEA support (Hoffman, 1996) and policy confusion (Selwyn 1999).

In understanding the use of ICT there is value in looking at schools which have succeeded in developing their use of ICT. In the UK, the British Educational Communications and Technology Agency (Becta) supported *ICT Test Bed* project (Somekh et al, 2006) does this by providing an account of special circumstances, i.e. schools with high access and high support. However, what about more everyday settings? This paper considers one school which has managed to develop its use of ICT and traces this development in some detail: what does the use of ICT in this school look like, how has ICT use been developed and what are the consequences? This study began with a search for a primary school which could be said to be using ICT 'effectively'. A panel of local advisors and academics looked at the notion of 'effective ICT use' and was asked to identify a school to exemplify such use. Both tasks proved unexpectedly difficult but eventually 'effective ICT use' became seen as using computers across the curriculum to support subject objectives (this suggests an association with the idea of integration of ICT, for more on this see Bowes, D'Onofrio and Marker (2006) and Baskin and Williams, (2006)). Six local schools were seen as using ICT particularly effectively. After visiting these schools a single main study school was selected as best meeting the definition of effective use.

The school

The school chosen for the main study was a two form-entry infant school (children aged five to seven years old) with a nursery (three to five year olds). The backgrounds of its 200 pupils were varied, but the majority were from homes in disadvantaged areas of the local authority. Its most recent Office for Standards in Education report (OFSTED is the national body for school inspection) presented a positive picture of a school that was well respected by teachers, pupils and parents and successful in raising attainment which was below average when pupils entered the nursery but average or above by the time they left. The school had one computer suite with a network of fifteen computers, which allowed the sharing of software and printers, transfer of files, and an interactive whiteboard with digital projector. Each classroom had one stand alone and one networked computer. All networked machines had access to the Internet. Other new technologies included a digital camera and a small number of programmable floor robots. The reception teacher was the ICT coordinator. There were nine teachers (including the Head Teacher and two part time teachers) and eight support staff (Teaching Assistants or Nursery Nurses). All were females.

The study

Data was collected from the school over a total period of 24 months from March 2003 until March 2005. During this time, a total of 16 full days (8.30 am-4.30 pm) were spent in the school, and this included two full days with each class (including nursery classes).

Pre-arranged, semi-structured informal *interviews* which lasted between twenty and sixty minutes were held with teachers, support staff, a governor and the technician. One of the authors (VC) *observed* lessons and the general life of the school and contributed where appropriate to teaching and support. General observational notes included layout of the school, the resources (ICT and non-ICT), and wall displays (those that included and those that did not include the use of ICT). Lesson notes covered the nature of the lesson, duration, resources used, teacher's talk and actions, and pupils' talk and actions. Pupils would be asked to explain what they were doing or what they were learning as they went about their work. Conversations were held with the teacher and the teaching assistant during and after the lesson about their use of ICT and the benefits or constraints that ICT use produced. Further conversations with staff members took place at lunch time or after the children had gone home. *Documents* such as school ICT policies and teacher's plans were collected. A *'timeline'* (a large sheet of paper divided up into columns by year and rows labelled with headings such as 'hardware', 'software', 'members of staff at the school', 'training received') was left pinned to the wall in the ICT suite so that teaching staff could record their memories. A *questionnaire* was sent to research participants towards the end of the research, in order to further elicit their views. Validation was sought through checking observations with staff and two formal feedback sessions.

A grounded theory approach was taken in the research. Grounded theory was first developed by Glasser and Strauss (1967) who argued for a more inductive, iterative, and ultimately flexible approach, contrasting with the prevailing logical deductive methods of the time. Strauss and Corbin later developed guidelines for carrying out grounded theory which offered systemic procedures for coding and analysing text, making it possible to 'relate structure with process' (Strauss & Corbin, 1998). They suggested that while many different categories are identified during the course of *open coding* of data, attention should also be given to *axial coding* to draw out linkages between these categories. This enables a grounded theory study to lead, as here, to a model presenting the causal conditions, contextual conditions and intervening conditions that give rise to a phenomenon and the consequences of that phenomenon. Grounded theory has of course limitations, and became the subject of deep dispute between its first proponents. However it was found to be fit for purpose for this study, concerned as it was to take a 'bottom up' approach to exploring the use of ICT and to offer a substantive theory on what was happening in one particular school. Of course this is an account of a single case but one that throws light on the combination of factors which influence ICT use.

The school and the use of ICT

Teaching and learning followed curriculum guidelines laid down by official bodies (DfES, 1999; DfES, 2000). The curriculum was very much topic oriented, in that learning objectives were delivered through activities related to topics such as 'the weather', 'rhymes and stories', 'travelling', 'patterns', and 'time'. The timetable was split into four

sessions (two morning and two afternoon sessions) with numeracy and literacy lessons generally taught in the morning. Although subjects were referred to by name on timetables and plans, subject boundaries were not obviously apparent to pupils or visitors, as activities were very much related to topics rather than subjects.

Again official guidance for ICT was followed (QCA, 2003). Much of this was covered within curriculum subjects, especially literacy and numeracy. A designated ICT lesson was timetabled once per week for each class in an afternoon, and this was referred to (within planning documentation and in conversation) as the 'ICT skills lesson'. Each class had three timetabled 'slots' per week in the ICT suite: one literacy lesson, one numeracy lesson, and one ICT skills lesson. Support staff played a large role in helping with activities that involved ICT. For instance, they would often supervise groups of pupils using hardware (e.g. class PC or programmable floor robot) inside the classroom or in the ICT suite.

Over the course of the visits to school, fifty five examples of ICT use were recorded, including the use of interactive practice software to develop number work; content free children's programs such as *TextEase*, *Clicker* and *Splosh*; a *Smartboard* (a type of electronic whiteboard), used by pupils and teachers in whole class settings; digital cameras and digital microscopes. This suggested frequent use of ICT. This use was observed most often within literacy and numeracy lessons (53% of recorded examples), followed by science (14%), history (14%), art (8%), design and technology (5%), geography (3%), and PSHE (personal, social and health education) (3%). ICT use was not observed in music or physical education and lessons focused on ICT skills were not observed. The Internet was not used by pupils very often in class though teachers did download teaching resources regularly and one teacher developed a project using email exchanges between schools. During observations the focus was upon whether ICT was being used to support the objectives of curriculum subjects or topics. Assessing use was not easy, as decisions were based upon interpretation of a range of information about teacher intent, teacher behaviour, and pupil response. Therefore, rather than using a classification based upon discrete categories, a continuum was introduced where, at one end, ICT was being used to support the objectives of curriculum subjects or topics, whilst at the opposite end ICT was being used as an 'add on'. Hardly any (approximately 5%) of the observed uses of ICT lay towards the 'add on' end of the continuum.

Describing and understanding the evolution and consequences of ICT use

Findings regarding the use of ICT in the school are presented within a grounded theory model or substantive theory, developed from Strauss and Corbin's (1998) coding paradigm (see Figure 1). Each element within the model is described and supported with evidence (the 'findings') from the study.

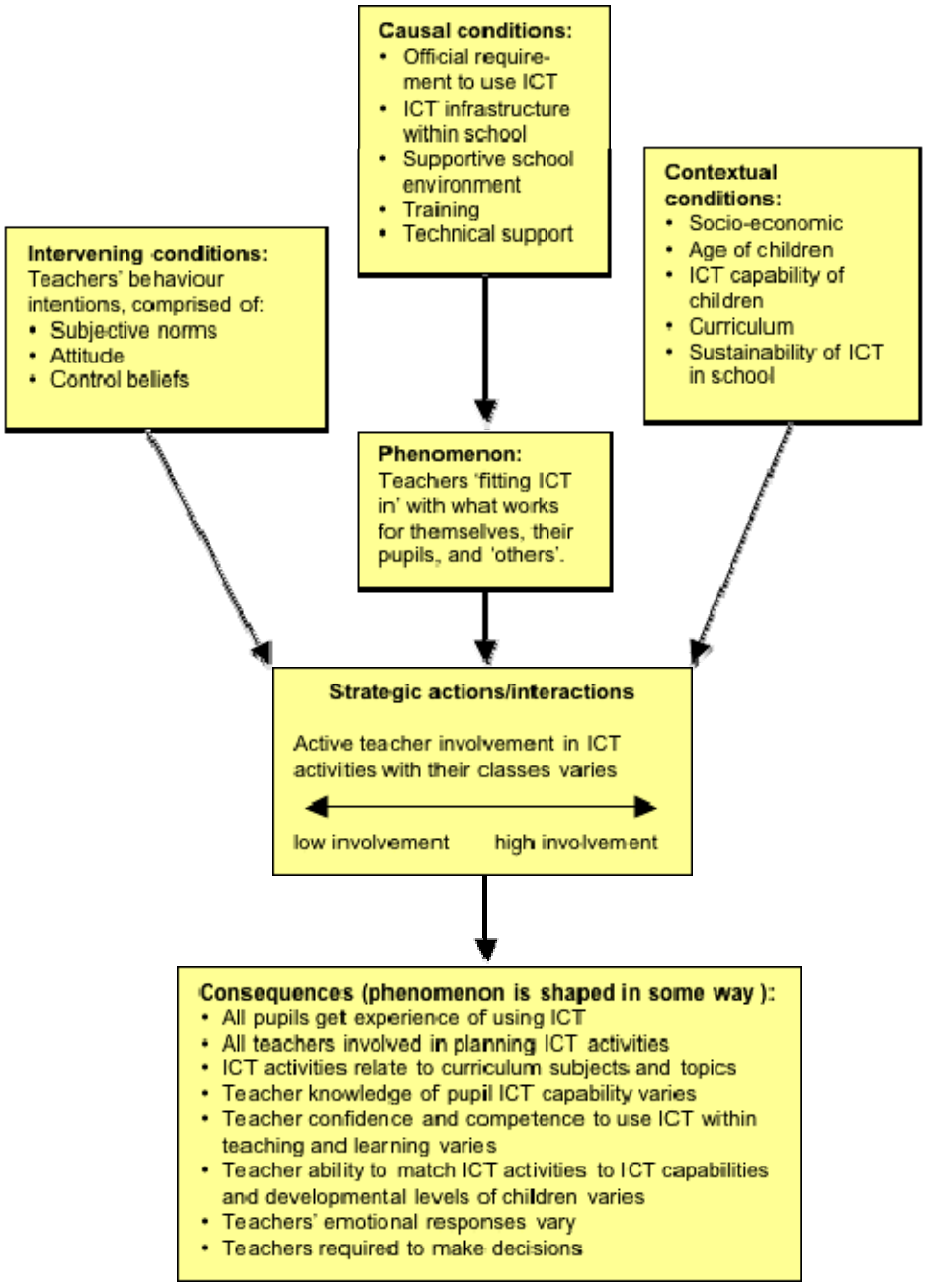

Figure 1: Theoretical model ('FIT' model) for the evolution and ensuing consequences of ICT use at the school

Five types of causal conditions, "sets of events or happenings that influence phenomena" (Strauss & Corbin 1998:131), emerged which impacted on teachers' ICT use. These were official requirements to use ICT; ICT infrastructure within school; supportive school environment; training; and technical support.

Official requirements to use ICT

Official guidance recommends that practitioners give opportunities for children to use ICT through the subject of ICT and through the use of ICT across the curriculum. All teachers were aware of these requirements and the use of ICT as a possible focus for OFSTED inspection, the results of which are made public and are seen as influential in establishing the reputation of a school. While there was a lack of clarity within policy and how initiatives for using ICT should translate into teachers' practices, staff believed the primary purpose for ICT use should be pedagogic and should centre on teaching and learning *with* ICT. As one teacher (pseudonyms have been used throughout the paper) put it:

I don't do it if I don't need it and it's not going to enrich the lesson. (Linda, Key Stage 1 teacher)

However, in practice this was not always the case. In some classroom activities the focus on computer skills, such as using the keyboard or learning how to copy and paste, meant that there was little focus on curriculum objectives. This was recognised by teachers when considering their rationale for using ICT, as reflected in Table 1, taken from the questionnaire answered by teachers and teaching assistants. In addition, some teachers undoubtedly saw the requirement to use ICT as an imposition and accepted that they used it because 'they had to'. The external sources for these feelings of imposition were the National Curriculum, OFSTED, and Government initiatives.

Table 1: Results from questionnaire question "Which *should* be the most important rationales for children aged 3-7 to use ICT in schools? " (14 respondents two of whom did not give second or third choices)

Order of importance	IT skills	Curriculum learning	Motivation	Access to curriculum	Preparation for society	Preparation for work	Reduce inequalities in access
1	4	7	1	1	1	0	0
2	2	3	2	3	1	0	1
3	2	1	3	4	2	0	1

ICT infrastructure within the school

By using a combination of Government funding and money raised by the school's Parent Teacher Association (PTA), the school had equipped itself with sufficient machines to provide teachers and pupils with regular access to both an ICT suite and computers in the classroom. The use of the ICT suite was timetabled for each teacher; this facilitated access and created an expectation to use ICT.

Supportive school environment

The category of 'supportive environment' overlapped with many other categories and included the properties of encouragement to use ICT, trust in the professional judgement of staff, knowledge sharing, support staff, technical support, and training.

The Senior Management Team in the school had consciously acted to promote the use of ICT within lessons by producing a timetable for the ICT suite whereby each class (apart from nursery) was allocated use of the suite for one literacy lesson, one numeracy lesson, and one ICT skills lesson per week. The nature of this action lay somewhere between persuasion and encouragement, as the head teacher, Tara, explained:

> Teachers don't have to use the slots. If they can give a good enough reason for not using computers in the particular lesson which they're to do, then that's fine, but invariably most teachers do take advantage of the opportunity to use them for numeracy and literacy. We don't want teachers to use ICT if they can do the same with other resources.

This could be described as 'trusting in the professional judgement of staff', and was implicit within the way the ICT coordinator had allowed ICT to develop in the school. The coordinator expected all teachers to take responsibility for planning and delivering lessons which included ICT.

Knowledge about how to use ICT was shared around the school and involved all members of staff. This was done informally by visiting each other's classrooms and the ICT coordinator was released one afternoon a week for support of other teachers. Many of the support staff were competent at using the software and hardware both because of the training they had received and because they had watched teachers use ICT with their pupils. For example, one teaching assistant mentioned how, with the knowledge she had gained from watching a fairly competent teacher use the *Smartboard*, she had often been able to help a particular teacher who was not so competent. Many support staff were able to supervise groups of children when they were involved in ICT activities and pass on ideas they had seen in different classes.

Training

All of the teachers in the school and many of the support staff had received basic skills training from a local college. Later, all teachers received government supported *New Opportunities Fund* (NOF) training which was provided by the Local Education Authority (LEA). This training was well received - teachers were particular appreciative that the trainer had a background in primary teaching and contextualised activities within curriculum application. Teachers with computers at home (n = 8) highlighted the value of having a machine on which to practise and reinforce training experiences.

Technical support

The caretaker had a special interest in ICT and the unusual situation arose in which he took on the role of part time technical support for extra remuneration. Most of the staff saw his role as pivotal in helping to develop and sustain their use of ICT as it meant that technical support was relatively inexpensive (compared to support from the LEA), it was provided by someone who was known to the staff and who understood the school context, and was readily available.

The phenomenon resulting from the causal conditions

Strauss and Corbin (1998:96) describe the 'phenomenon' as "The central idea, event, happening, incident about which a set of actions or interactions are directed at managing, handling, or to which the set of actions is related".

Overall, teachers were making decisions about the use of ICT with their classes on a 'best fit' basis. The head teacher (Tara) summed this up:

> You have to adapt new initiatives to fit with what works for the teachers, the pupils and the school as a whole. You adapt them because there are things you do like and don't like - things that work in your school and also things that don't.

The label 'fitting ICT in', rather than 'effective use of ICT', was developed to describe the complex decisions and actions that teachers made both collaboratively and individually regarding ICT use. These decisions were made with regard to their own needs, their pupils' needs, and the needs of 'others' (such as parents, the government, or society). This was a 'best fit', it may not have satisfied everyone in every respect but it was more or less adequate for most of the parties involved. In this sense, the core category or central phenomenon varied. For instance, what was meant by 'fit ICT in' varied in nature according to *whom* (teachers, pupils, the whole school, other stakeholders); *what* (teachers' preferred ways of working, availability of technology, the curriculum, practical constraints); *why* (to learn ICT skills or to support subject objectives or other purposes for ICT use); and *how* (separate ICT skills lessons or use within other subjects). In other words, each teacher was operating and making decisions within her own particular set of conditions (causal, contextual and intervening) and, in doing so, showed different levels of involvement in ICT activities.

Contextual conditions

Contextual conditions refer to "the specific sets of conditions (patterns of conditions) that intersect dimensionally at this time and place to create the set of circumstances or problems to which persons respond through actions/interactions" (Strauss & Corbin, 1998:131). These included socio-economic backgrounds of the children; age of children; ICT capability of children; curriculum; and sustainability of ICT in school.

Socio-economic backgrounds of the children

A questionnaire had been sent out by the school to parents and had established that over half the children in the school had no access to a home computer. The head teacher felt that this was undoubtedly because of the socio-economic circumstances of their backgrounds. Teachers saw a correlation between home use and a child's ICT capability and felt that children without home access tended to be less capable than those with home access. Children with low ICT capability would tend to demand more teacher time during any lesson that included ICT, and teachers responded to this in different ways. For instance one teacher used the information about pupil home access to help her plan and

differentiate ICT activities, while other teachers enlisted the help of support staff to cope with the demands of children who lacked the necessary ICT skills.

Age of children

Teachers needed to adapt to developmental levels of their children when planning and teaching their lessons and in physically organising their pupils. For example, with younger children the whole class were often sat on the carpet in front of the *Smartboard* so that the teacher could clearly demonstrate exactly what pupils were to do during their time on individual computers, but it was very difficult for a whole class of six and seven year old pupils to fit on the carpet in the same way and presentations to pupils worked less well.

ICT capability of children

The varying ICT capability of the children placed extra demands on teachers. Some pupils needed constant help and support when using ICT and this put these teachers off wanting to use it. Other teachers talked of the importance of having separate ICT lessons. As Anna, a reception teacher, put it "otherwise you'd spend the whole of a literacy lesson focusing upon ICT skills instead of literacy".

Curriculum

The pressures of the curriculum had the potential to alter the adaptations that had been made by the school. For instance, teachers of the oldest children felt there was a difficulty in finding time to fit in the ICT skills lessons that had been timetabled one afternoon per week for them in the IT suite, as they felt under pressure to spend more time preparing their pupils for Statutory Assessment Tests (SATs) in literacy and numeracy.

Sustainability

Sustainability issues mostly focused around money, or more specifically, the school having enough funds to spend upon ICT, and having the ability to spend what they had flexibly. Money was needed in order to sustain technical support, ICT infrastructure, and training.

Technical support would need to be addressed if the caretaker were to leave. As far as infrastructure was concerned, the head and the ICT coordinator recalled their shock at being told, after an upbeat and optimistic presentation by the LEA on government funding plans, that the school would have to find most of the money to sustain its use of ICT from its own budget. Given that the school was relatively small and in a socio-economically deprived area this was a huge difficulty. They also recognised that budget circumstances restricted their opportunities for ongoing professional development in the use of ICT, especially in terms of paying for release time to observe others' practice, to attend courses, or to pay for advisors to come in and work with their classes.

Intervening conditions

In addition to context, there were also intervening conditions that influenced teachers' choices of adaptation strategies. Strauss and Corbin (1998, p.131) define intervening conditions as "those that mitigate or otherwise alter the impact of causal conditions on phenomena... often arising out of contingencies (unexpected events), which in turn must be responded to through a form of action/interaction". During axial coding, the category of 'teacher views and beliefs' emerged as a major influence upon individual teacher adaptations to using ICT with their classes. Theoretical sampling helped to develop the category, re-establish it as 'teachers' behaviour intentions', and suggest that behaviour intention was influenced by three factors highlighted in earlier work by Azjen and Fishbein (1980) and Davis et al (1989), namely: subjective norms, attitude, and control beliefs. These three factors could be classed as 'intervening conditions' in that they had the potential to alter the impact of the causal conditions in the model (Figure 1).

'Attitude' or 'perceived usefulness' describes how a teacher might feel about the outcome of using ICT with their class and the value such a teacher places upon those outcomes. 'Attitude/ perceived usefulness' seemed to be closely linked with rationales for ICT use, in that particular rationales were sometimes inherent within teachers' descriptions and justifications for use. For instance, the societal rationale was inherent when teachers spoke about children needing ICT because they were growing up in a society in which it was widely used. The pedagogic rationale was inherent when teachers talked about children feeling empowered by using ICT or teachers using programs to appeal to different learning styles. Most of the teachers who took an active involvement said that their principal rationale for ICT use was to support learning across the curriculum. Teachers who took less involvement, and all of the teaching assistants, gave other principal rationales. A further finding was that nearly all teachers believed that when they used ICT the learning process was different, but learning outcomes stayed the same. However, two teachers disagreed and felt that there were outcomes that could not be achieved without ICT. These two teachers had particularly strong positive attitudes to ICT.

'Subjective norms' describe how a teacher might perceive the 'social acceptability' of using ICT and their motivation to want to comply with this. Teachers who took less of an active involvement tended to suggest that their use of ICT was something brought about through pressure rather than choice. This confirms speculation by Tearle (2002) that in many contexts attitude may outweigh the importance of social norms but with respect to ICT, this imbalance may be less marked.

'Control beliefs' or 'ease of use' describe how much control individual teachers feel they have over their actions. Control beliefs were reflected within all of the decisions and judgements that individual teachers made regarding the use (or non-use) of ICT with their classes. For example, Wendy, a nursery teacher, often talked about the various strategies she had developed for making ICT use with her class 'easier'. Her strategies had been informed by past experiences of using ICT with her class and were often put in place to pre-empt potential problems that she might have foreseen. Teachers who took less of an

active involvement in ICT were, not surprisingly, less comfortable using ICT than those who were more actively involved.

Strategic actions / interactions

In the presence of the context and intervening conditions described above, the phenomenon of the teachers 'fitting ICT in' with what worked for themselves, their pupils, and 'others,' led to the development of differing adaptation strategies. These varied along a continuum, ranging from low to high teacher involvement in ICT activities with their classes. The strategies are illustrated in Figure 2. Comparing the criteria within the strategies against observational data, approximately half of the teachers lay at the 'high involvement' end of the spectrum, two lay somewhere in the middle, and two lay towards the 'low involvement' end.

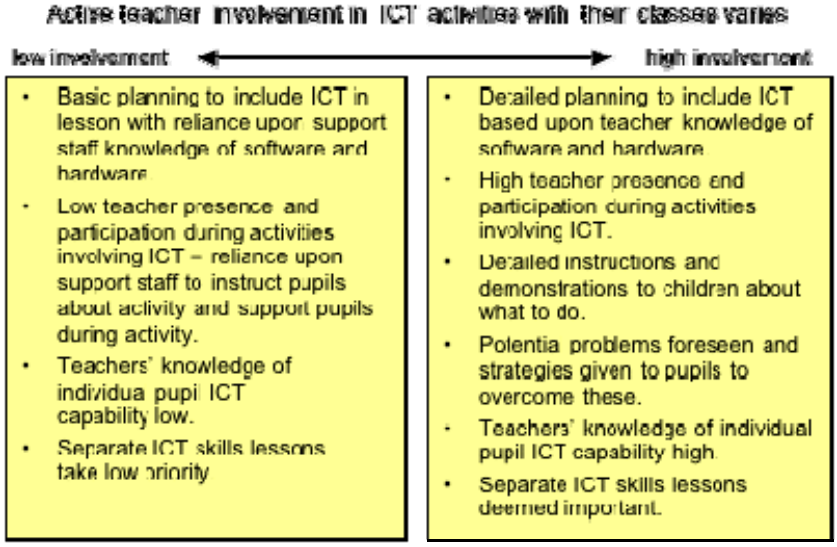

Figure 2: Individual teacher adaptation strategies for using ICT with their classes

Consequences

At a whole school level, teacher strategies succeeded in ensuring that every pupil had experience of using ICT. All teachers in the school were also involved in the planning of lessons that included ICT and as a result, all uses of ICT were related in some way to what pupils were doing at that particular time within the rest of the curriculum. Although the links between the ICT use and curriculum area were sometimes tenuous, when questioned, pupils almost always saw their use of ICT in relation to the context of a particular lesson, curriculum area or topic and not in terms of 'learning how to use this piece of software or hardware', unless of course, the lesson was a designated ICT skills lesson. This was in contrast to the other five schools that had been observed in preparation for the case study, in which the ICT coordinator planned all lessons that included ICT and subsequently most ICT use focused upon ICT knowledge and skills.

As for individual teachers, those who became actively involved in ICT became more adept at planning and teaching for lessons which involved ICT, whereas those teachers who took less of an involvement found that planning and teaching for lessons which involved ICT was demanding. As teacher involvement varied, so too did teachers' knowledge about the ICT capabilities of their pupils and so did their competence and confidence at being able to plan and teach to include ICT. Teachers who took an active involvement became more knowledgeable about software and hardware, more able to match ICT activities to pupil abilities, to use ICT to support a particular lesson, to foresee where problems might arise, and to develop strategies to overcome these problems.

Other consequences were that teachers, particularly those who showed little involvement in ICT activities, sometimes felt a sense of guilt or confusion. These feelings were rarely explicitly referred to but became apparent during observations and informal conversations. For instance, some teachers apologised during observations, saying that they 'wouldn't be doing much ICT today', or that they would 'only be doing this', as if this would be judged to be 'not good enough'. At other times, there seemed to be some confusion as to whether the ICT activities they had planned were really 'enhancing what went on' or whether the ICT was being used 'for the sake of it'.

Discussion

There is considerable overlap between the findings in this study and some of the literature cited earlier, and it is no surprise that access, technical support, and a supportive senior management that creates expectations, are all needed in order to develop the use of ICT. However, the study adds to this literature in four significant ways.

First, within the presentation of the conditions, two findings are of particular note. One is that government guidance was seen as both a causal condition for ICT and an imposition, and this had implications for professional practice. Some teachers felt under pressure to use ICT, but this sometimes brought about a situation whereby they felt they had to use ICT even against their 'better' professional judgement. The other noteworthy finding concerns the favourable way in which NOF training was perceived, confirming the importance of: prolonged and sustained support from an expert to model curriculum practice; talk and deliberation; the sharing of ideas and observation of others' practice within a conducive atmosphere (e.g. Bennet, 1994; Harland & Kinder, 1997). This was unusual in the context of the NOF training program itself which has often been criticised for excessive focus on IT skills, lack of collaborative training, and failing to differentiate between learners (Galanouli, Murphy & Gardner, 2004; OFSTED, 2004).

Second, this study has highlighted that the general literature on using ICT in school is relevant to an infant school setting, albeit this study also indicates some of the distinctive features of using ICT with this age group.

Third, a picture emerged of teachers and other members of the school who seemed to be acting individually and collaboratively to 'fit ICT in' as best they could to suit variables such as their own practice, the needs of the children and the expectations of various

'stakeholders'. This was a balancing act based upon (often pragmatic) decisions regarding the pros and cons of ICT use. Seen from this perspective, even those teachers who expressed little involvement with ICT could not be perceived as 'reluctant', 'technophobic' or 'Luddite' (a view of teachers portrayed in some of the literature, see Miller and Olson (1994), Selwyn (1999) or Watson (2001) for more on this). Rather these teachers were holding on to tried and tested practices that they had taken a long time to establish. From their viewpoint, using ICT may potentially take a lot of extra work to master and may not be so effective in their classroom.

Fourth, the study offers a re-visioning of what we can expect from ICT in schools. There may well be other schools which show more 'successful' use of ICT, and certainly more favourable pupil to computer ratios and more advanced equipment, to which the terms 'good' or 'effective' may more naturally be applied. However, our sense is that 'fitting ICT in' is as 'good as it gets' bearing in mind the conflicting set of pressures schools have to work within. Assuming similar conditions exist in other schools, then the notion that all schools are somewhere along a path of ICT adoption that will ultimately lead to a transformation in teaching and learning is unrealistic. Rather, the trajectory will always be one of using ICT on a 'best fit' basis and this may have much less of an impact on what is taught or how it is taught (this is arguably confirmed in the Test Bed work cited earlier in which the use of electronic whiteboards, a technology which could be seen as easily supporting existing teaching styles, featured strongly). Of course it is possible for conditions to change, for example through a shift in official curriculum guidance and assessment; through developments in the extent and quality of training and support; and through greater access to ICT, but this is a more complex and long term enterprise than many realise.

Research on the use of ICT in education often slips into a 'promotional view' of ICT use that denigrates current educational practices and claims that ICT can change the nature of education and raise the quality of teaching and learning in simplistic and non-problematic ways. Indeed, some studies, while lacking evidence to suggest that ICT use in schools is beneficial, end with suggestions for 'the infusion of technology into schools' (e.g. Van Braak, 2001; Zhao & Cziko, 2001). The results of this study suggest a more realistic, and more teacher centred, approach is needed which, rather than acting to promote the use of ICT in schools, focuses upon deliberation, questioning, reflection, collaboration and understanding between researchers and practitioners. As Olson (1981: 272) pointed out, "the innovator has to adopt a more humble role. Granted, the innovator may possess valid images of educational practice, but these images are nothing if they cannot be translated into the working language of practice".

References

Abbot, C. (2001). *ICT: Changing education.* London: Routledge-Falmer.

Ajzen, I. & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour.* New Jersey: Prentice Hall.

Ajzen, I. (1988). *Attitudes, personality and behaviour.* Milton Keynes: OU Press.

Baskin, C. & Williams, M. (2006). ICT integration in schools: Where are we now and what comes next? *Australasian Journal of Educational Technology*, 22(4), 455-473. http://www.ascilite.org.au/ajet/ajet22/baskin.html

Becker, H. (2000). How exemplary computer-using teachers differ from other teachers: Implications for realizing the potential of computers in schools. *Contemporary Issues in Technology and Teacher Education*, 1(2), 274-293.

Becta (2001). *Primary schools of the future - Achieving today: A report to the DfES.* Coventry: Becta. [verified 22 Jul 2007] http://partners.becta.org.uk/upload-dir/downloads/page_documents/research/primary_schools_future_2001.pdf

Bennet, C. (1994). Reconceptualizing staff development for technology diffusion. *Journal of Information Technology for Teacher Education*, 3(2), 147-160.

Bowes, K., D'Onofrio, A. & Marker, E. (2006). Assessing technology integration: Its validity and value for classroom practice and teacher accountability. *Australasian Journal of Educational Technology*, 22(4), 439-454. http://www.ascilite.org.au/ajet/ajet22/bowes.html

Broadfield, D. (2001). Case study: Robin Hood primary School, Birmingham. In *National professional qualification for head teachers, unit 4: Strategic management of ICT.* London: Department for Education and Skills.

Cox, M., Preston, C., & Cox, K. (1999). What factors support or prevent teachers from using ICT in their classrooms? Paper presented at the British Educational Research Association Annual Conference. Brighton: University of Sussex. [verified 22 Jul 2007] http://www.leeds.ac.uk/educol/documents/00001304.htm

Cox, N., Abbott, C., Webb, M., Blakeley, B., Beauchamp, T. & Rhodes, V. (2003). *ICT and attainment: A review of the research literature.* Coventry: Becta. [verified 22 Jul 2007] http://www.becta.org.uk/page_documents/research/ict_pedagogy_summary.pdf

Cuban, L. (1993). Computers meet classroom: Classroom wins. *Teachers College Record*, 95(2), 185-210.

Davis, F., Bagozzi, R. & Warshaw, P. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35(8), 983-1003.

DfES (1999). *The National Curriculum Handbook for Primary Teachers in England, Key stages 1 and 2.* London: Department for Education and Skills.

DfES (2000). *Curriculum Guidance for the Foundation Stage.* London: Department for Education and Skills. [verified 22 Jul 2007]

http://www.standards.dfes.gov.uk/eyfs/resources/downloads/5585_cg_foundation_stage.pdf

Galanouli, D., Murphy, C. & Gardner, J. (2004). Teachers' perceptions of the effectiveness of ICT-competence training. *Computers & Education,* 43(1-2), 63-79.

Glaser B. & Strauss A. (1967). *The discovery of grounded theory: Strategies for qualitative research.* New York: Aldine de Gruyter.

Goodson, I. & Mangan, M. (1995). Subject cultures and the introduction of classroom computers. *British Educational Research Journal,* 21(5), 613-628.

Harland, J. & Kinder, K. (1997). Teachers' continuing professional development: Framing a model of outcomes. *British Journal of In-service Education,* 23(1), 71-84.

Harrison, C., Comber, C., Fisher, T., Haw, K., Lunzer, E., McFarlane, A., Mavers, D., Scrimshaw, P., Somekh, B. & Watling, R. (2002). *ImpaCT2: The Impact of Information and Communication Technologies on Pupil learning and Attainment.* Coventry: Becta. [verified 22 Jul 2007] http://partners.becta.org.uk/index.php?section=rh&rid=13606

Hoffman, B. (1996). What drives successful technology planning? *Information Technology for Teacher Education,* 5, 43-55.

Hulme, R. & Hulme, M. (2000). Lessons from Virginia: Supporting teachers in implementing effective strategies for the use of ICT in subject teaching. *Computer Education,* 96, 1-9.

Jamieson-Proctor, R., Burnett, P., Finger, G. & Watson, G. (2006). ICT integration and teachers' confidence in using ICT for teaching and learning in Queensland state schools. *Australasian Journal of Educational Technology,* 22(4), 511-530. http://www.ascilite.org.au/ajet/ajet22/jamieson-proctor.html

Kennewell, S., Parkinson J. & Tanner, H. (2000). *Developing the ICT capable school.* London: Routledge.

Lawson, T. & Comber, C. (1999). Superhighways technology: Personnel factors leading to successful integration of information and communications technology in schools and colleges. *Journal of Information Technology for Teacher Education,* 8(1), 41-53.

Leach, J. & Moon, B. (2000). Pedagogy, information and communications technology and teachers' professional knowledge. *The Curriculum Journal,* 11(3), 385-404.

Lim C. P., Khine M. S., Hew, T., Wong, P., Shanti, D. & Lim, B. (2003). Exploring critical aspects of information technologies integration in Singapore schools. *Australian Journal of Educational Technology,* 19(1), 1-24. http://www.ascilite.org.au/ajet/ajet19/lim.html

Miller, L. & Olson, J. (1994). Putting the computer in its place: A study of teaching with technology. *Journal of Curriculum Studies,* 26(2), 121-141.

Moseley, D., Higgins, S., Bramald, R., Hardman, F., Miller, J., Mroz, M., Tse, H., Newton, D., Thompson, I., Williamson, J., Halligan, J., Bramald, S., Newton, L. & Tymms, P. (1999). *Effective pedagogy using ICT for literacy and numeracy in primary schools.* Newcastle: University of Newcastle.

OFSTED (2001). *ICT in schools: The impact of Government initiatives: An interim report.* April 2001. London: OFSTED. http://www.ofsted.gov.uk/publications/index.cfm?fuseaction=pubs.summary&id=1043 [verified 23 Jul 2007]

OFSTED (2004). *ICT in Schools: The impact of government initiatives five years on.* London: OFSTED. http://www.ofsted.gov.uk/publications/index.cfm?fuseaction=pubs.summary&id=3652 [verified 23 Jul 2007]

Olson, J. (1981). Teacher influence in the classroom: a context for understanding curriculum translation. *Instructional Science,* 10, 259-275.

QCA (2003). *Information and Communications Technology (ICT). Teacher's guide, A scheme of work for key stages 1 and 2.* London: Qualifications and Curriculum Authority and Department for Education and Skills.

Reynolds D., Treharne, D. & Tripp, H. (2003). ICT - the hopes and the reality. *British Journal of Educational Technology,* 34(2), 151-167.

Selwyn, N. (1999). Why the computer is not dominating schools: A failure of policy or a failure of practice? *Cambridge Journal of Education,* 29(1), 77-91.

Somekh, B, Underwood, J., Convery, A., Dillon, G., Harber Stuart, T., Jarvis, J., Lewin, C., Mavers, D. Saxon, D., Twining, P. & Woodrow, D. (2006). *Evaluation of the ICT Test Bed Project, Annual Report.* Coventry: Becta. [verified 22 Jul 2007] http://www.evaluation.icttestbed.org.uk/reports

Strauss, A. & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory.* London: Sage.

Tearle, P. (2002). *The implementation of information and communications technology for teaching and learning in secondary education in the United Kingdom.* PhD Thesis. Exeter: University of Exeter.

Van Braak, J. (2001). Individual characteristics influencing teachers' class use of computers'. *Journal of Educational Computing Research,* 25(2), 141-157.

Veen, W. (1993). How teachers use computers in instructional practice - four case studies in a Dutch secondary school. *Computers and Education*, 21(1/2), 1-8.

Watson, D. (1990). The classroom vs. the computer room. *Computers and Education*, 15(1), 33-37.

Watson, D. (2001). Pedagogy before technology: Re-thinking the relationship between ICT and teaching. Education and Information Technologies, 6(4), 251-266.

Zhao, Y., & Cziko, G. (2001). Teacher adoption of technology: A perceptual control theory perspective. *Journal of Technology and Teacher Education*, 9(1), 5-30.

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